# CAN WE BREAK THE CURSE OF OUR EVOLUTIONARY MISMATCHES?

THE TEXT OF A PUBLIC LECTURE BY

**MOUSAB AZZAWI**

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**CAN WE BREAK THE CURSE OF OUR EVOLUTIONARY MISMATCHES?**

There are two evolutionary mismatches with our contemporary complicated life that dominates how our brains function in our daily lives. The first one is related to the fact that our brains innate functionality had developed mainly in a hunter-gatherer environment. The evolutionary history of modern humans (Homo sapiens sapiens) and their extinct predecessors in the genus Homo (Australopithecus afarensis, Homo habilis, Homo erectus, Homo neanderthalensis and several others) spans almost 7 million years. Humans have been living in large societies only after adopting farming around 12,000 years ago, and in modernity since the scientific revolution in the 17$^{th}$ century. The modern humans' brains have been sculpted and refined by the forces of natural selections that endow these biological organs with hardwired innate networks that are adaptable, suitable, compatible with the hunter gatherer lifestyle not our modern sophisticated lives. The second mismatch emerges from the factual context of the first mismatch and is related to the default attitude for humans to seek immediate gratification and discount any future reward on the basis that it may not materialise in the future, as there were no assurances for the human brains that guarantee the possibility of living for another day during almost all the evolutionary history of our species. In other words, we, modern humans, have two big problems: our brains are designed for hunter gatherer lifestyle and are motivated naturally to seek immediate gratification and seize the nearest reward without contemplating the future prospects that may not materialise.

Research in brain physiology points to a perpetual battle between two regions of the brain when it comes to decision-making and opting for an immediate reward or a delayed one. On the one hand, the normal activity in the nucleus accumbens and the ventral tegmental area - regions along the mesolimbic dopaminergic pathway - that are responsible for continuously seeking all types of immediate rewards which can maximise the fitness of the organism in the form of survival and more possibilities for reproduction. On the other hand, the prefrontal cortex which is a part of the brain that is responsible for higher-order cognitive capacities and acts like a break that can negatively suppress the activity of the immediate reward seeking regions in the brain. The prefrontal cortex is physiologically associated with cognitive control and the ability to maintain, manipulate, and integrate goal-relevant information over time delays that enable future-oriented behaviours after being dissociated from impulsive desires during the course of our daily lives. This eternal battle can be conceptualized as “humans’ perpetual desire–reason conundrum.”

However, there is a very special character of the incessant struggle between the desire push and the reason resistance in our brains. It is related to the fact that the prefrontal cortex does not come with fully fledged functional capabilities when we are born, but it needs nurturing and training to gain its full power as it reflects a recent anatomical emergence in our evolutionary journey. In fact, the prefrontal cortex is a major part of what makes us human. Nonetheless, the reward seeking regions in our brains are very similar to those in the other mammalian species without too much anatomical or physiological difference. They

work according to the hardwired innate networks that can only be modified slightly with life experiences and operant conditioning without diminishing the scope of their functionality. In other words, humans need to train hard to be able to think rationally, but they are born with natural tendencies to seek basic rewards such as food, drink, shelter and sex that maximise their fitness for survival and reproduction, or any other intermediary reward that can lead eventually to these basic rewards.

There is also another special characteristic of the prefrontal cortex related to the fact that higher mental capabilities in the human brain are big consumers of energy in the form of glucose, whose sources were scarce during most of the evolutionary process of our species. That led to a universal tendency in the brain to rely on basic hardwired reactions in the reward seeking regions that consume much less energy to steer our orientation along with the emotional neural circuits in our midbrain that act in a very similar manner to the reward seeking regions, without involving the energy hungry parts of the brain i.e. the prefrontal cortex. In other words, our default tendencies are towards using simplified models of thinking and habitual/emotional reactions to preserve energy without involving our higher mental capabilities.

As we said earlier, we know that the prefrontal cortex needs nurturing, education and training to be fully functional. Let us contemplate the actuality of this happening in our modern lives. Our educational systems are mainly formulated to manufacture obedient individuals, who are meticulous in following our efficient and sometimes Machiavellian learning tricks to pass the exams, then seek employment in which they

receive orders that they have to comply with without any power to question them in the majority of cases. Teaching freethinking, creativity, logic and perspective taking is not part of our educational system. Also, the complexity of our modern lives had produced a new system of social connections through the Internet and social media that consumes around seven hours of our every day time globally, mostly in passive consumption mode that does not operate the higher mental capabilities in any way but activates mostly the emotional parts of the brain that triggers strong feelings in the form of fight or flight reaction which is the key magnet that maximise the probability that the individual will stay longer on one of these virtual platforms or click on one of the click bates that fill the space of all these platforms. Similarly, all contemporary modes of conducting politics are built on playing on the strings of emotions not manifestoes or programmes that require scrutiny and in-depth analysis. We live in the era of emotional and identity politics that is based on our primitive evolutionary instincts to follow herd mentality, stereotyping, prejudice and simplified generalisations that do not require the prefrontal cortex with its higher mental analytical powers as absorbing and assimilating these fallacies passively is reserved to other less sophisticated parts of our brains that we share with all other mammalian species. The same can be said about exchanging information systems in the market economy that dominate the globe now, which are based on the main principle of the advertising industry which works to manufacture primal urges, invented needs and falsified illusions, and avoids the risk of creating informed consumers that can compare facts that are usually hidden in fine print and drowned in a flood of terms and conditions and other legalese, as in the perspective of the advertising industry it's better for everybody not to

trouble her or his prefrontal cortex with these unnecessary details and remain a happy, docile, unwitty and passive consumer.

As always, the question that arises when we are faced with such grim description of certain concealed facts about the nature of our individual and societal lives cannot escape from presenting itself in the form of the old question: what can I do then? And the answer, as it always has been, is simple and without too many details and is based on refusing to retire the unique powers of your brain by accepting what is common makes it right. Also, we have to remember that the only way to nurture our prefrontal cortices and their wisdoms can only happen through working hard to self-educate ourselves outside the bubble of the traditional educational system as well as the eco-chambers of the social media. It is also worth remembering that brain physiology reminds us that the most efficient way to refine, sharpen and lubricate our higher mental analytical skills is by learning how to cooperate, interact, dialogue, exchange information with other fellow human beings in order to allow our higher mental capacities to flourish and break the vicious cycle and curse of our evolutionary mismatches and the shackles that keep them dominant and pervasive in our daily lives.